David

MEMO

TO: All PDP-9 USERS

FROM: Ivan

SUBJECT: PDP-9 SCHEDULING RULES DATE: June 17, 1970

Use of the PDP-9 is controlled by a continuous auction. The continuous auction will permit users to choose between short periods of computer use at convenient hours and longer periods of use at less convenient times. Since quotas cannot be consumed, machine-availability will be the only factor limiting a user's access. This memo outlines some rules for bidding. If these rules need modification to make the system work better, we will change them.

1. Purchasing power:

   Authorized users will be assigned a purchasing power for computer time in units called "yen". A user's yen should be thought of as his endowment. Yen cannot be spent. They are assigned permanently.

2. Bidding:

   A user with some yen to use the computer may sign up in advance for time on the schedule posted in the PDP-9 room. The user may sign up for as much time as he wishes. Blocks signed up for must not be less than 30 minutes long, nor may they begin or end at times other than x:00 or x:30. A user must indicate on the sign-up sheet an integer number of yen he is willing to "pay" for each block of time

he signs up for. The number of yen indicated will be for the entire block specified. The "price" of the computer in yen-per-hour is the bid divided by the length of time signed for.

3. Bidding Limits:

The minimum bid is one yen. There is no minimum price, since a minimum bid may cover any period of time. The maximum bid for any user is his purchasing power in yen. The maximum price for time will be a maximum bid on a 30-minute time period. Most important of all:

Rule 1. The total of any user's outstanding bids for all future time must not exceed his purchasing power in yen.

As soon as time is used, the yen placed on it are freed to be re-bid. Yen are not consumed by bidding, merely invested.

4. Raising the bid:

If a user wishes to outbid a previous applicant for a particular time he must bid for that time at a higher price. Unless otherwise indicated, the price of time will be computed linearly by dividing the bid value (in yen) by its duration. Thus if user A has bid one yen for a three-hour period (price A=1/3), user B can pre-empt time by bidding one yen for two

of the hours (price B=1/2 yen per hour). User A's single yen will then be effective for his remaining time (price A= 1 yen per hour).

5. Continuity of time:

Rule 2. When bidding on blocks of time already bid, a user must bid on either the beginning or the end of the block.

This rule need not be followed if the block already bid is six hours or longer in duration. This rule is to prevent breaking up long blocks of time unnecessarily.

6. Minimum remainder:

Rule 3. If a user bids on part of a block already bid, the remaining part (if any) must be at least an hour long.

A user is, of course, free to pre-empt all or any block of time. If the block already bid is already less than an hour long, any part of it may be pre-empted.

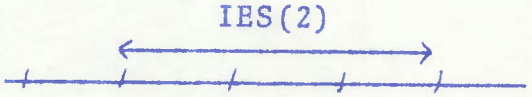
7. Rainbow bids:

Rule 4. Consecutive blocks bid by a single user are considered to be a single block for the purposes of Rules 2 and 3.

Rule 4 permits a user to indicate a preference for the beginning or end of the time he bids. For example, a user might distribute 6 yen on a three-hour block thus: three yen for the first hour, two yen for the second hour, and one yen for the final hour. Such bids will be called rainbow bids.

8. Recording a bid:

A schedule has been posted in the computer room. Bids are recorded on this schedule by drawing a line for the time duration desired with arrowheads at the ends of the chosen period.



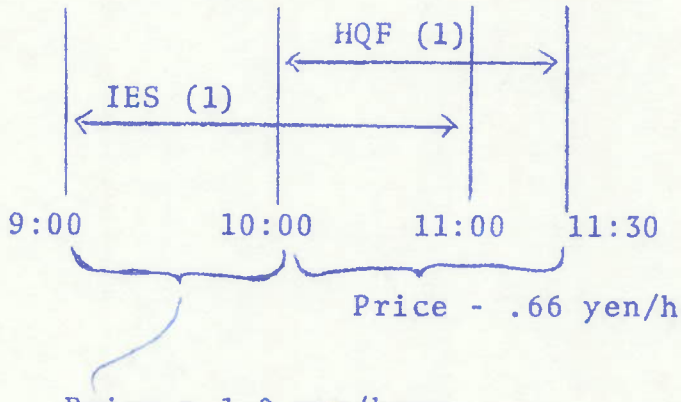
The user's official initials or symbol will be recorded within the time period. The bid will always be recorded in the lowest line on the schedule unencumbered for the time period chosen by other bids.

Together with his initials or symbol, the user will record the magnitude of his bid. The bid rate or price is not explicitly recorded, but must be computed by dividing the bid magnitude by the time duration of the bid. Users will refrain from recording prices on the schedule. It is a new bidder's responsibility to ensure that his bid rate is higher moment-by-moment than the bid rate of any bidder he is pre-empting before he bids. Because successive bids are placed above one another, the top bid at any time will be awarded the computer.

The price of remaining portions of partially pre-empted time is automatically increased. If a part of a block is pre-empted, the entire amount of the partly pre-empted bid will be considered to be effective on

the remaining period. Thus to compute the price of time, one divides the previous bid effective for that time by the total period during which that man is the successful bidder.

For example:



9. Cancelling bids:

Bid may be cancelled at any time by crossing them out on the schedule. A user may not, however, re-bid on time he has previously cancelled. A user may, however, raise his bid on any time by pre-empting himself. Pre-empted bids should not be crossed out by the pre-emptor.

10. Invulnerable bids:

Those with an absolute hourly allowance, those engaged in maintenance and anyone wishing to give a demonstration may place an invulnerable bid thus:

These bids cannot be pre-empted, and can be used to

pre-empt any yen bid placed on the schedule. The restrictions to the use of invulnerable bids are as follows:

Rule 5: Total hours of invulnerable bids, excluding demonstrations and maintenance, must at no time exceed the user's hour allowance.

Rule 6: At no time may a user have more than one hour's demonstration time booked. Exemption from this rule can be granted only by Ivan.

For purposes of determining maintenance time, maintenance will be considered the function of repairing the PDP-9 main frame, the Dectapes, the tester, or any "production"-type of equipment to be added in the future, for example the scope after it has been debugged. Additions to the machine, or updating existing equipment must be bid on by the person making the changes.

11. Freezing the schedule:

Each morning at 9:00 A.M., the schedule for the following day will be frozen. Thus, for example, on Monday morning, Tuesday's schedule (9:00 A.M. Tuesday to 9:00 A.M. Wednesday) will be frozen; and on Friday morning, the schedule for Saturday will be frozen. On Friday evening at 5:00 P.M., the schedule for Sunday and Monday will be frozen.

When the schedule is frozen, time remaining open is then automatically available on a first-come-first-

served basis without the possibility of subsequent competitive bidding or of pre-emption by invulnerable bids. The minimum bid for such time will be one yen.

Ivan E. Sutherland

IES:pk

AUTHORIZED USERS AND

"YEN" AUTHORIZATION 9/65

(or hourly time allocation)

Production (PROD)	24 hours (invulnerable bid) of which only 12 hours may be scheduled during any one day (a day runs from 9:00 A.M. to 9:00 A.M.)
Production	1 yen (to be used to pick up unused time after the schedule is frozen.)
Gary (GWH)	5 yen
Chuck (CLS)	5 yen
Ed (ECC)	10 yen
Manuel (MCL)	5 yen
Alan (ACE)	5 yen
Steve (SNM)	5 yen
Greg (GPF)	2 yen
Quint (HQF)	5 yen
Ivan (IES)	no yen
Marketing (MKT)	5 yen
Hess (HM)	2 yen

Effective Date: June 22, 1970

Remember - time for Sunday and Monday must be signed before 5:00 P.M. Friday